

Comparison of interconnections between barley breeding material traits under organic and conventional growing conditions

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Keywords : breeding for organic farming, selection criteria, correlations, growing environments

While breeding for organic farming it is necessary to identify the most appropriate growing conditions in which to perform the selection process. Soil fertility, crop management, yield level and other factors may vary very much between each organic farm, and between organic farms and research institutions where the selection is usually performed. Since plant breeding requires considerable input of resources and the market for organic varieties is limited, it is essential to find the most appropriate selection conditions that will provide acceptable varieties for organic farms.

Spring barley breeding lines selected from two cross combinations (Primus/Idumeja and Anni/Dziugiai) at two distinctive organic and two conventional locations were used in the study. The organic location 1 was situated in a research field of the plant breeding institute (with green manure as fertilizer), the organic location 2 included an organic farmer's field (with stable manure as fertilizer), the conventional location 1 was located in a barley breeding field (with medium level of mineral fertilizer input) and the conventional location 2 in a seed production field of the institute (with high mineral fertilizer input).

Selection of the breeding lines was done under the respective growing conditions starting from F3 generation. Most appropriate lines for growing in organic farming were selected at all 4 environments. Selected breeding lines were evaluated in F5 (n=20-23 per cross combination, without replications) and F6 generations (n=10 per cross combination, 3 replications).

Correlations between barley traits and the environments and cross combinations will be compared in the presentation.

The analysis of the correlation between grain yield and observed plant traits of F5 lines indicated that tendencies between the lines obtained from both cross combinations as well as between the environments were dissimilar in most of the cases. Soil shading (evaluated at early stem elongation stage) correlated positively with grain yield in all cases; the correlation was always significant for lines from the cross Primus/Idumeja, but only at the conventional location 2 for Anni/Dziugiai lines ($p < 0.05$). A significant positive correlation between grain yield and plant development speed at tillering stage as well as between yield and plant height at the beginning of stem elongation was found for Primus/Idumeja lines at both organic locations and at the conventional location 1 ($p < 0.05$). Plant height before harvest did not correlate significantly with yield under organic conditions which is in contradiction with some other studies. There was a tendency for planophyle growth habit to correlate positively with yield under organic and conventional conditions for lines from both cross combinations.

The analysis of correlation of the F6 lines will be included in the presentation.

This study was performed with financial support of EEA grant EEZ08AP-27 and European Social Fund co-financed project 2009/0218/1DP/1.1.1.2.0/09/APIA/VIAA/099.